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REPORT
TO
PARKING AUTHORITY OF SAN FRANCISCO
ON
PROPOSED PUBLIC GARAGE
IN THE
CENTRAL MARKET STREET AREA

NOVEMBER, 1951

PARKING AUTHORITY OF S. F.
500 GOLDEN GATE AVE. 11
SAN FRANCISCO 2, CALIFORNIA

BUREAU OF ENGINEERING
DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF SAN FRANCISCO

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FOREWORD AND SUMMARY

The following report has been prepared for the Parking Authority of San Francisco by the Bureau of Engineering of the Department of Public Works. Field surveys and office studies were performed by the Traffic Engineering Division of the Bureau under the direction of Ross T. Shoaf, Traffic Engineer and William Marconi, Assistant Traffic Engineer.

The report analyzes the parking needs of the business district bordering Market Street on either side from First Street to Seventh Street. It shows that the area most critically short of off-street parking facilities straddles Market Street between Third and Fourth Streets. As the first and most practicable step toward meeting this need, it is recommended that a 1200 stall garage be constructed on relatively cheap land in the interior of the block bounded by Market, Third, Mission and Fourth Streets.

Preliminary estimates of required investment and operating income and expense are presented in sufficient detail to show that the project should pay for itself in 20 years or less.

Ralph G. Wadsworth
City Engineer

November 30, 1951

REPORT ON
PROPOSED PUBLIC GARAGE FOR
THE CENTRAL MARKET STREET AREA

INSTRUCTIONS FOR SURVEY

This report has been prepared to conform with instructions received from the Parking Authority of San Francisco under date of May 16, 1951, in which it was specified that the report should cover the following subjects:

1. An estimate of the present and probable future parking demand in the vicinity of Market Street between Second and Sixth Streets.

2. A recommendation as to one or more possible locations for a parking garage or garages within a suitable distance of the primary parking generators in the area.

3. Recommended capacity and minimum standards of layout and design for such garage or garages.

4. Tentative entrance and exit layouts for such garage or garages with relation to adjacent traffic flow.

5. Probable total investment for such garage or garages including land, construction, engineering and incidentals.

6. Estimated annual operating, maintenance, administration, interest and amortization costs for such facility or facilities.

7. Estimated annual gross income.

8. Probable net annual income.

DESCRIPTION OF AREA STUDIED

The survey covered the area along Market Street from First Street to Seventh Street, and extending southerly to Harrison Street and northerly to a line about 1200 ft. from Market Street and parallel to it. This area consists of a number of fairly well defined units of more or less homogenous land use characteristics. In a general way the units south of Mission have a land use which may be termed "Goods handling". In the units north of Mission Street the land use in general falls into the category of "non-goods handling". The individual units and their potentialities with reference to street parking requirements are described below:

North of Market Street between Front and Kearny

The land use in this area is predominantly financial. This intensive use tends to create an expanding need for garages if prices are reasonably low and if street facilities provide satisfactory approaches. This type of land use appears to be expanding in San Francisco and conforms with a general trend which was described in a recent report by Alderson and Sessions, marketing and management counselors, in connection with a recent traffic survey in the City of Philadelphia. The type of parking demand generated in a financial district is principally all day parking.

North of Market Street between Kearny and Powell

This area is primarily devoted to retail trade with some space devoted to office use. Customers reach their destinations

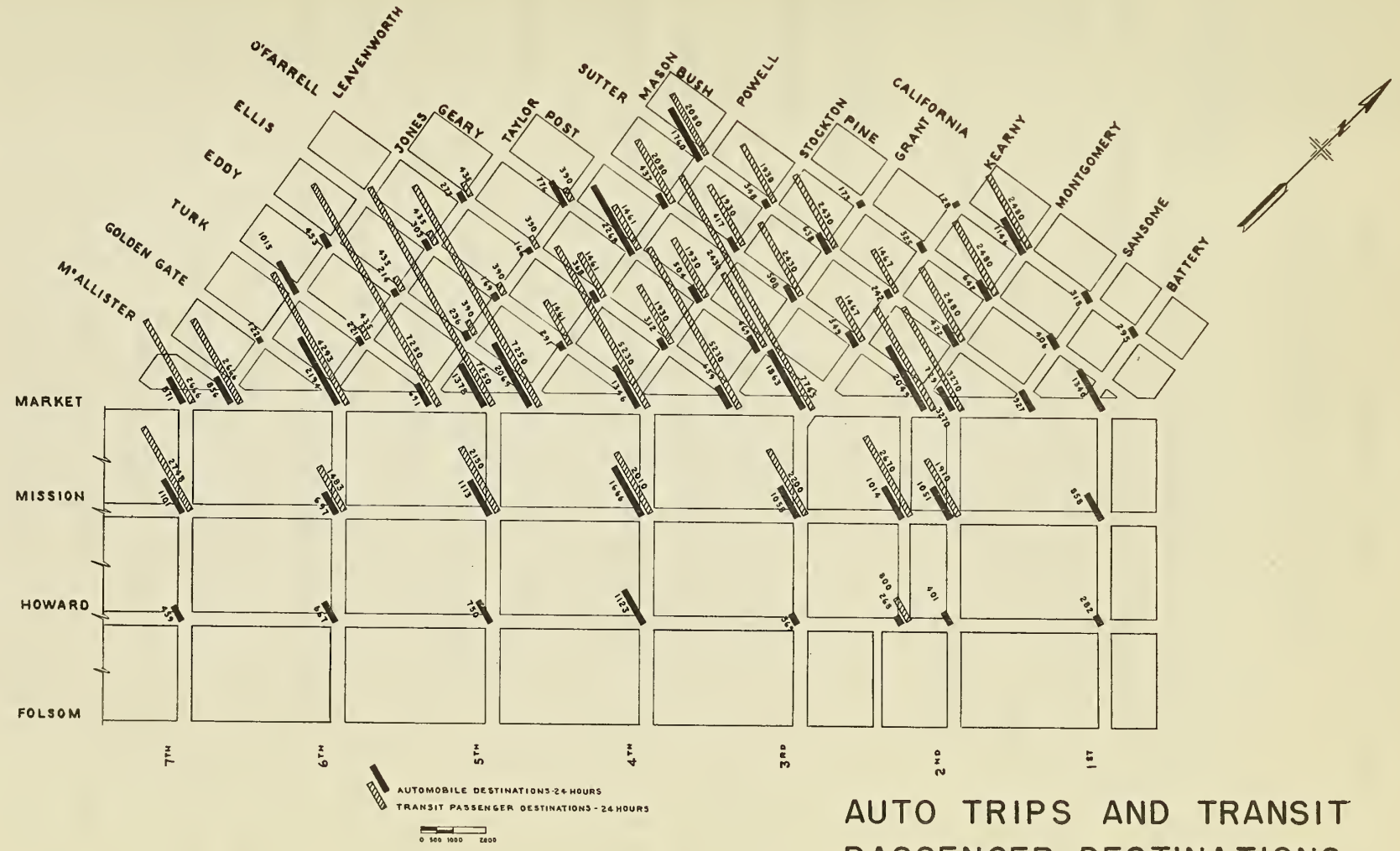
principally by use of mass transportation. This may be seen by reference to Plate I, which shows for each intersection in the downtown area the relative number of persons who arrive and depart by bus and street car as compared with those who use private autos. This ratio will be seen to be relatively high in the retail trade area compared to elsewhere. Additional parking facilities would undoubtedly cause some diversion from street car to private automobile and thereby develop additional business for a garage. Any major trend in this direction would, of course, affect adversely the Municipal Railway's income. On the other hand, new customers now shopping elsewhere would be attracted to the downtown district. In the above mentioned report by the Alderson & Sessions firm, it was indicated that retail trade in a central business district will hold its own and probably grow. This indicates an increasing demand for parking space from this quarter.

North of Market between Powell and Jones

This land is used for residential purposes, parking lots and recreational purposes. The parking demand is not likely to increase except on the eastern fringe where retail business is encroaching.

Between Market and Mission

The land use in this area is mixed wholesale and retail and partly financial. The wholesale units will tend to leave the central business district and be replaced by retail and



AUTO TRIPS AND TRANSIT PASSENGER DESTINATIONS
CENTRAL MARKET STREET AREA

PLATE I

CENTRAL MARKET ST.
PARKING SURVEY
NOVEMBER 1951

financial units. This more intensive type of land use, in turn, will increase the parking demand in the future.

South of Mission

This area is now devoted primarily to light industry and wholesale merchandising. Trends indicate that this type of land use will be displaced from the central business district and be replaced by a more intensive type of land use. This should increase the demand for parking space in this area.

METHOD OF STUDY

Available Data

Extensive data on the ultimate destinations of parkers in the downtown area were made available as a result of the Bay Area Metropolitan Traffic Survey of origins and destinations conducted during 1946 and 1947 by the California State Division of Highways in cooperation with the City of San Francisco and the Public Roads Administration, Federal Works Agency. These figures were used as a basis for the Chapter on "The Parking Program" which was included in the report on a Transportation Plan for San Francisco prepared for the City Planning Commission in November 1948 by De Leuw Cather and Company, Consulting Engineers and Ladislas Segoe and Associates, Consulting City Planners. The analysis in that report, however, was based on land areas of several city blocks designated as segments. In the present study the analysis has still further segregated the figures so as to

Availability Data

apply to the smaller areas surrounding each of the street intersections in the area under consideration.

Daytime Demand

A recent check of the cordon count taken in 1947 indicates that daytime traffic in the central business district has increased 15% in the four years that have elapsed since the Bay Area Survey was made. For the present study, therefore, all of the daytime demand figures as of 1947 were increased by 15%.

Nighttime Demand

The nighttime demand figures from the Bay Area Metropolitan Traffic Survey have been disregarded because they were based on a sample too small for statistical stability. From field investigations and results of interviews with parking lot operators, it appears that there would be little demand for night time parking in the vicinity of Market Street except on Monday shopping nights.

Inventory of Supply

All garages and parking lots in and about the survey area were investigated as to the number of cars parked, night and day, the peak hours of parking and the rates charged. The results were checked against a similar study made in 1947 and, where large discrepancies were noted, the operators were again contacted. All curb spaces in the survey area were classified as to the type of parking restrictions. The turnover rates for each type of curb were based on the results of several previous

studies. The 12-hour curb turnover rates expressed in vehicles per stall were estimated as follows:

40 Min. Parking meters north of Howard Street	11
1 Hour Parking meters north of Howard Street	9
Parking meters on Howard Street or south of Howard St.	7
Painted zones	4
No Parking zones on Market Street	2.5
No Parking zones in Alleys	1.5

ANALYSIS

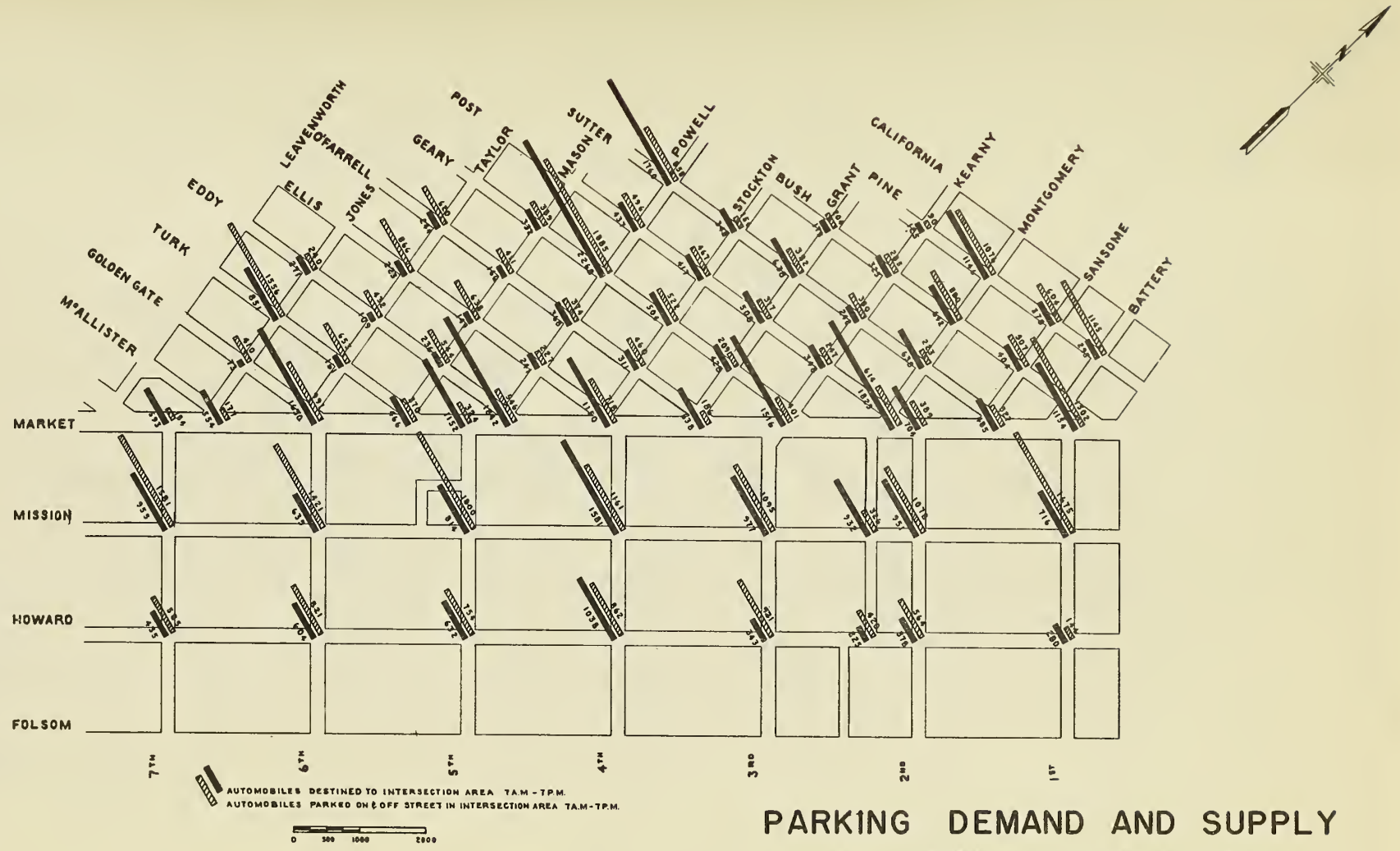
Plate II has been prepared to show graphically by double bars the daytime parking demand and the actual number of automobiles parked in each intersection area. The excess of demand over supply or vice versa, for each intersection area was then determined and these results are shown on Plate III.

The solid bars on Plate III represents excess demand and the striped bars, excess supply. From Plate III it can be seen that many motorists who have destinations in regions of excess demand are now parking in areas of excess supply and walking considerable distances to their destinations.

From Plate III it also appears that there are five main areas of excess demand, which at first glance look as if they might support additional parking facilities. They are outlined on the drawing in dash-dot lines and may be described as follows:

1. The financial district, bounded on the west by Kearny Street.

2. The area about Market Street centering around Third Street, Fourth Street and Grant Avenue.

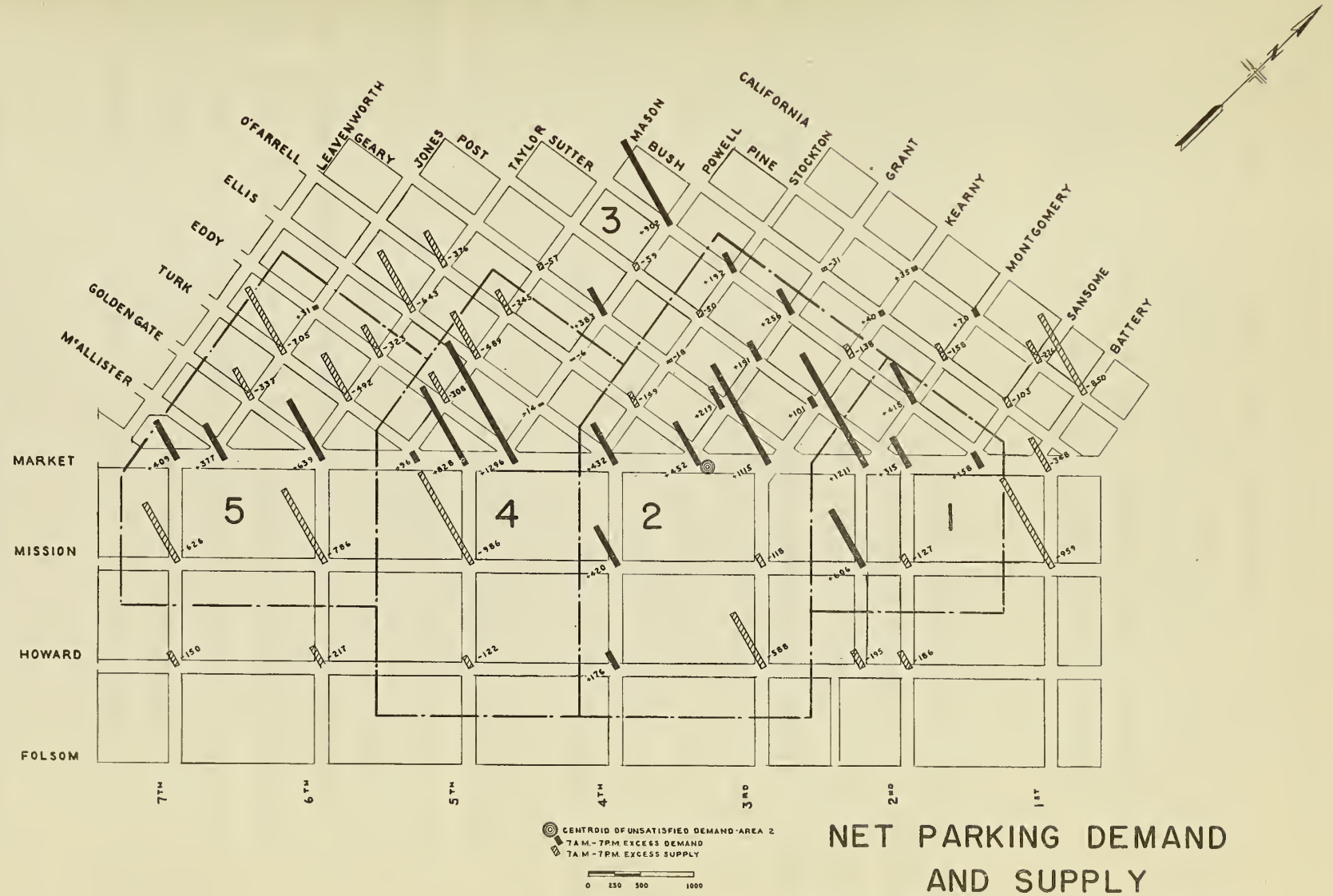


PARKING DEMAND AND SUPPLY BY INTERSECTION AREA

CENTRAL MARKET STREET AREA

PLATE II

CENTRAL MARKET ST.
PARKING SURVEY
NOVEMBER 1951



NET PARKING DEMAND AND SUPPLY
CENTRAL MARKET STREET AREA

PLATE III

CENTRAL MARKET ST. PARKING SURVEY
NOVEMBER 1951

3. The district around Sutter and Powell Streets.

4. The area around Fifth and Market Streets.

5. The area around Sixth, Seventh and Market Streets.

Factors influencing the location of an off-street parking facility in each of these areas are as follows:

Area 1

At the present time, two new large garages, are in prospect, one being under construction in the vicinity of Lick Place and the other being planned for St. Mary's Square. They will have a substantial effect on parking demand and supply in this area. Before constructing additional facilities, it would be wise to observe the effect of these new garages. Also, the wisdom of providing more parking space for what appears to be predominantly all-day parking is questionable. The turnover per space is low in this area and all-day parking increases the peak-hour strain on the street facilities. A better answer would be to provide more efficient transit service to this area. Despite the general trend away from mass transit usage, studies by the De Leuw Cather Company indicate that transit companies are able to keep and, in fact, to increase their peak-hour patronage if the service is good. While a garage located in this district would probably be profitable, it was not investigated for the time being because of the present contemplated new garage construction.

Area 2

A garage in this area would serve the retail shopping area. The location would be excellent from the viewpoint of retail

business. There is no nearby parking facility now. A garage in this location designed to cater exclusively to shopping parkers would not strain the street facilities and would tend to keep customers of retail stores in the central business district and stop the tendency toward decentralization.

Area 3

Off-street parking in this location would serve retail, hotel and office buildings. A complete survey of this area was not made because it is somewhat beyond the limits of the survey area defined by the Parking Authority. It is a possibility for future consideration, however.

Area 4

There is now a considerable excess of demand over supply at the intersections of Market and Powell, Market and Fifth, and Market and Mason Streets, which apparently is now being met by the excess supply at adjacent intersections although at some inconvenience to parkers. In addition, there are very high transit-passenger car ratios at these intersections, indicating considerable possibility of diversion from street-cars to private autos if the price of parking is made low enough. If a new facility were to be located near Fifth and Market Streets (for example at 5th and Mission Streets), it would be able to draw some trade from other parking facilities. This added competion would probably tend to lower parking rates in the vicinity and thereby generate new passenger car traffic. A garage in this area has good potentialities if the operating cost can be kept low.

Area 5

Conditions in this area and the resulting conclusions are similar to those stated for Area 4.

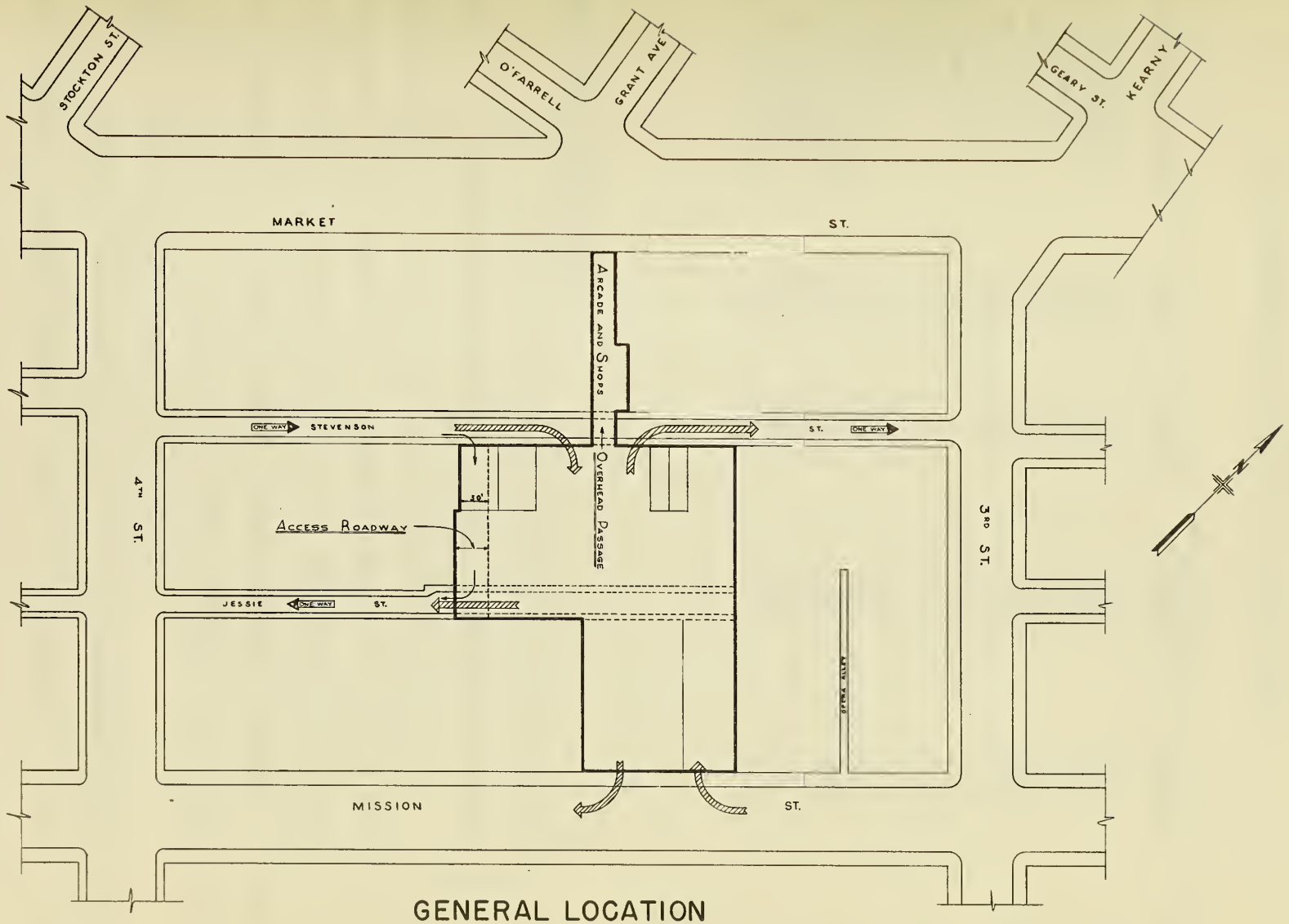
PROPOSED LOCATION OF THE NEW FACILITY

From the viewpoint of maximum service in the downtown area, the ideal location would be at a point within Area 2. The centroid of unsatisfied parking demand in Area 2 lies on Market Street slightly east of Grant Avenue. (See Plate III). The nearest reasonably priced available land is in the interior of the block bounded by Market, Third, Mission and Fourth Streets. Plate IV shows a tentative site which would be suitable in whole or in part for a large garage structure.

This location is in complete accord with the recommendations contained in the report on a Transportation Plan for San Francisco previously mentioned. By reference to page 6-7 of that report, it will be noted that the area bordering Market Street between Spear and Eighth Streets showed the highest parking demand in the downtown district and that the site for off-street facilities to serve the area should be located as close as possible to the mid-point between Third and Fourth Streets.

ESTIMATED PATRONAGE OF PROPOSED GARAGE

In order to determine the probable use of a garage at the proposed location, the unsatisfied demand in the area was assigned to the existing facilites and to the proposed garage on the basis of relative distances to each, provided that maximum walking distance was not exceeded and the available existing facilites were not already filled. The assignment of unsatisfied demand to the proposed garage is shown in Table I, including the percentage factors used. The total patronage on this basis is shown to be approximately 3,000 vehicles on an average 12-hour day at the present time.



GENERAL LOCATION
FOR
PROPOSED GARAGE
CENTRAL MARKET STREET AREA

PLATE IV

CENTRAL MARKET ST.
PARKING SURVEY
NOVEMBER 1951

TABLE I

Assignment of Vehicles to New Garage

Intersection Area	Demand	Supply	Unsatisfied Demand	% Assigned	Assigned Demand
Fourth and Market	1150	718	432	65%	283
Grant and Market	638	186	452	100%	452
Third and Market	1516	401	1115	100%	1115
Grant and Geary	428	209	219	100%	219
Grant and Post	508	317	191	100%	191
Grant and Sutter	638	382	256	8%	20
New Montgomery and Market	1825	614	1211	9%	109
New Montgomery and Mission	932	326	606	0	0
Fourth and Howard	1038	862	176	10%	18
Fourth and Mission	1581	1161	420	85%	357
Fifth and Market	1152	324	828	0	0
Powell and Market	1842	546	1296	20%	259
Third and Mission	977	1095	---	---	---
					3023

EXITS AND ENTRANCES:

The tentative location selected for the garage will provide for entrances from Fourth Street (through Stevenson St.) and from Mission St. Exits can be provided into Third St. (through Stevenson St.), Fourth St. (through Jessie St.) and Mission St. To use Jessie St. as an exit way, it is necessary to make it one-way westbound. For this reason a new roadway between Stevenson St. and Jessie St. should be provided through the garage area for vehicles with destinations on Jessie St.

Because the rate structure later proposed would tend to discourage all day parkers in favor of shopping parkers, a smaller

unloading peak will be experienced than would be the case if the garage catered to office workers. It is therefore anticipated that this facility will not impose a large additional strain on street facilities during the peak hours. Previous traffic studies have indicated that about 11% of the total 10-hour shopping load leaves the retail stores in the hour from 4:30 to 5:30 P.M. Applying this percentage to the 3,000 garage patrons, it is found that 330 vehicles should leave the garage in the peak hour. This averages less than 6 vehicles per minute that would have to be absorbed by the three major arteries upon which the garage discharges. Additional capacity to be provided on these streets by new traffic signals soon to be installed, and other contemplated improvements, should be more than ample to handle the relatively minor evening peak-hour load imposed by the garage.

The morning peak hour from 7:00 to 8:00 A.M. will prove no problem under the proposed operation since the garage will not be open at that time.

Pedestrian movement between the garage and Market Street would be provided for by an arcade over-passing Stevenson Street and descending to the Market Street sidewalk.

DESIRABLE GARAGE CAPACITY

The median value of 12-hour turnover rates in off-street parking facilities in the close vicinity of Market Street is 1.7 vehicles per stall. If, however, a facility is close to a high demand area, as this proposed garage will be, and the rate structure discourages long time parkers, a much higher turn-over

rate could be obtained. This is shown by the fact that fifteen percent of the existing facilities have turn-over rates of 2.5 or more, the highest being over 4.0. For the purpose of determining the size of the garage to be built, it is assumed that a turn-over of 2.5 vehicles per stall per 12 hours can be maintained. The number of spaces required for the garage, would therefore be 3,000 divided by 2.5 or 1200 stalls. Attention is called to the fact that this does not include the additional demand that would arise by diversion of transit trips or by generation of entirely new trips created only by reason of a new facility.

The area of the proposed garage site shown on Plate IV, including the enclosed portion of Jessie Street, but excluding the 25 ft. strip extending from Stevenson Street to Market Street, is approximately 81,000 sq. ft. This area will not be fully available for garage use due to the fact that allowance must be made for the proposed roadway between Stevenson and Jessie Streets previously mentioned and also for the ground level area probably to be occupied by an electric company substation. The net area available for garage purposes will be about 77,000 sq. ft.

Assuming that 250 square feet is required per vehicle, to provide for stall space, aisles, ramps and servicing and reservoir areas, it will be possible to accommodate 308 vehicles on one floor. On this basis it will be necessary to construct four floors to provide the proposed 1200 parking stalls.

LAYOUT AND DESIGN

Parking floors should normally have a 22-foot aisle with stalls on both sides. Stalls should be deep enough to accommodate

cars 18 feet long. The width may be 7-1/2 feet if attendant parking is contemplated but should be 8 feet if customers are to park their own cars. The combination of an aisle with two rows of stalls gives a normal unit floor width of 58 feet. With attendant parking, it is permissible to allow double parking, end to end, in portions of the floor area.

The receiving floor should provide several entrance lanes and have reservoir capacity properly coordinated with the rate at which cars can be removed and parked during peak intake periods. It should preferably be on the second floor at the same level as the pedestrian arcade leading to Market Street. Ramps must be designed to permit rapid delivery of cars to customers during peak outflow periods.

Facilities for servicing cars should be provided on the floor level first reached from the street. Such services tend to attract parking patronage and the income therefrom helps to assure the financial soundness of a garage venture.

The major layout problem in design of a garage is the scheme for circulation, that is the movement of cars in and out and particularly between floors. Many different plans have been used in existing garages, some having been designed to fit special site conditions. Elevators have generally been discarded in favor of ramps to give more speed and avoid delays due to mechanical trouble. A frequently used design often called the "staggered floor system" divides the building into two parts with offset floors so that each ramp rises only a half story. This is the

scheme used in the Union Square Garage. The site considered in this report offers no particular limitation on the circulation plan to be employed and no recommendation is made as to the type which should be adopted.

The garage structure must be of Class 1 construction in accordance with the San Francisco building code. Reinforced concrete construction will probably be more economical than structural steel frame construction, although steel columns cause less obstruction of parking areas. Architectural treatment must be approved by the City's Art Commission. Walls could be omitted on the Mission Street frontage if not needed for resistance to earthquake forces. The structure could be designed so as to permit the addition of another story in the future.

REQUIRED CAPITAL INVESTMENT

The following is a preliminary estimate of the total initial cost of the proposed project:

Land acquisition	
8 parcels as shown on Plate IV containing 73,900 sq. ft.	$ 900,000
Wrecking existing buildings (net cost)	20,000
Garage building, including equipment,	
4 floors @ 77,000 sq. ft.	
308,000 sq. ft. @ $8.00	2,464,000
Sub-Total	$3,384,000
Engineering, legal and incidental expense @ 10%	336,000
Total Cost	$3,720,000

The above summary indicates a cost per parking stall of $3,100, of which the land cost accounts for about $825, leaving a net construction cost of $2,275 per stall.

The cost of land acquisition shown above includes the purchase of a small parcel on which is located a power substation belonging to the Pacific Gas & Electric Company. No allowance has been made for removing this equipment, on the assumption that the garage could be built around and over it.

It should also be noted that the construction cost does not cover the proposed pedestrian arcade between the garage and Market Street although the necessary land for it is included in the proposed land acquisition. It is believed that the arcade could be developed so as to accommodate small shops on one side, which would provide rentals sufficient to cover all costs of construction as well as operation and maintenance charges.

When more detailed plans are prepared for the garage structure, it may possibly be found that it would be economical to utilize a lesser land area and provide more stories. Five or even six stories would probably be satisfactory from an operating standpoint. A decision can only be made after a thorough investigation of land acquisition problems, foundation conditions and alternative garage designs.

OPERATING POLICIES

It is recommended that, if this proposed parking facility is constructed, the San Francisco Parking Authority should maintain close control of the operational policies. The facility and

its rates should be so set as to encourage the shopping parker, and to discourage long time parking. This can be effected by maintaining a uniform hourly rate throughout the day. This is in direct contrast to the policy that is now being pursued by all off-street parking facilities in the downtown area. While it may be more profitable from the viewpoint of the operator to obtain a certain amount of long time parking, it will not be so from the viewpoint of the central business district as a whole. The excellent location in this case should obviate the necessity of retaining long time parkers as a prerequisite to making a fair return on an investment.

It is suggested that the garage be open for business only from 9 a.m. to 7 p.m. on Tuesdays through Saturdays and from 9 a.m. to 11 p.m. on Mondays, holidays excluded. This schedule will satisfactorily accommodate all shoppers and will further discourage all-day parking.

ANNUAL INCOME

Revenue from parking fees are estimated on the basis of a straight charge of 25 cents per hour. Average parking time is assumed to be two hours. Turnover is estimated as 2.5 during daytime and 1.0 on Monday evenings. Sales and servicing income is estimated at 13¢ per car parked, and car washing is estimated at $2.00 profit on 4% of the cars parked. The garage is assumed to be open on 306 days per year. The estimated annual income is as follows:

ANNUAL INCOME

Parking Fees	$ 490,000
Sales and Servicing	120,000
Car Washing	73,000
	$ 683,000

This revenue could be augmented somewhat by renting a portion of the Mission Street frontage for stores or shops but the net return would be reduced by added costs of construction, operation and maintenance.

ANNUAL COSTS

Annual operating costs are estimated as follows:

Operating Costs

Payroll, incl. taxes and insurance	$ 268,000
Utilities, supplies and services	17,000
Insurance and claims	7,000
Administration and general expense	15,000
Property taxes	87,000
Total Operating Cost	$ 394,000

NET ANNUAL INCOME

The net annual income, after paying property taxes, would be $289,000. This amount is equivalent to 7.8% annually on the total investment and is available for interest and amortization charges, income taxes and profit.

It is assumed that the City will retain a continuing control over garage operating policies and rate schedules and will therefore sooner or later own the structure as well as the land on which it is built. It is further believed that the property owners to be benefited by the parking facility should make a substantial contribution to its cost. Any number of financial plans could be worked out embracing either or both of these ideas. Three possible cases are outlined below to illustrate the rate at which investments made by the City could be recovered. None of them contemplate any profit to be made by private promoters nor income taxes to be paid.

Case 1.

Project financed and operated by City.

Bond interest rate 2½%.

The net operating income would be sufficient to pay interest and amortization charges on the total investment in about 16 years.

Case 2.

Project financed and operated by City but half of the total cost to be paid by assessment on benefited property owners over a period of 20 years.

Bond interest rate 2½%.

Property owners would pay $119,000 annually.

City income would be $289,000 plus $119,000 or $408,000 per year.

This would pay interest and amortization charges on the total investment in about 10 years.

Case 3.

Project financed and operated by a non-profit corporation sponsored by merchants until paid for. Land purchased by City with 2½% bonds to be amortized in 20 years. Other costs financed by loans and fixed-dividend stock, average rate of interest being 5%.

Net operating income	$289,000
Interest and amortization City bonds	63,500
Available for loans and stock	225,500

This amount would pay the interest and amortization charges at the 5% rate in about 19 years.